

REMARKS

Claims 1-38 were examined by the Office, and in the final Office Action of May 29, 2008 all claims are rejected. With this response claim 12 is amended. Applicant acknowledges that the claims are being amended after a final Office Action, but respectfully submits that claim 12 is amended to comply with formal requirements mentioned in section 2 on page 2 of the Office Action. Claim 12 is amended to clarify what is configured on line 7 of claim 12. Accordingly, applicant respectfully submits that the amendment to claim 12 will not require any additional search or substantive examination on the part of the Office. Furthermore, applicant respectfully submits that the amendment to claim 12 will reduce the issues for purposes of appeal. Therefore, applicant respectfully requests entry and consideration of the amendment to claim 12.

Applicant respectfully requests reconsideration and withdrawal of the rejections in view of the following discussion.

Claim Rejections Under § 112

In section 2, on page 2 of the Office Action, claim 12 is rejected under 35 U.S.C. § 112, second paragraph as being indefinite. In response to the rejection, claim 12 is amended to recite that the encoder is configured to perform the action recited in the claim. Therefore, applicant respectfully requests withdrawal of the rejection to claim 12.

Claim Rejections Under § 102

In section 4, on page 2 of the Office Action, claim 37 is rejected under 35 U.S.C. § 102(b) as anticipated by Weinberger et al. (U.S. Patent No. 5,680,129). Claim 37 contains limitations similar to those recited in claim 1, and therefore for at least the reasons discussed below with respect to claim 1, claim 37 is not disclosed or suggested by Weinberger.

Claim Rejections Under § 103

In section 6, on page 3 of the Office Action, claims 1-4, 8-13, 15, 19-24, 26-33, 36 and 38 are rejected under 35 U.S.C. § 103(a) as unpatentable over Weinberger in view of Kato (U.S. Patent No. 5,392,037). Applicant respectfully submits that the cited

references, alone or in combination, fail to disclose or suggest all of the limitations recited in claim 1. The cited references at least fail to disclose or suggest searching for a prediction value corresponding to a pixel, determining the difference between the pixel and the prediction value to select a method for encoding the pixel, encoding a code word to indicate the selected encoding method, and encoding the pixel into the encoded bit string so that the encoded bit string has a restricted number of bits that is fixed for substantially all of the encoded pixels in the image, as recited in claim 1.

Weinberger is directed to a lossless image compression encoder/decoder system having a context determination circuit and a code table generator. The image compressor uses the context of a pixel to be encoded to predict the value of the pixel and to determine a prediction error. The image compressor contains a context quantizer that quantizes the context of pixels. The image compressor counts the error values for each quantized context and uses these counts to generate context-specific coding tables for each quantized context. As it encodes a particular pixel, the encoder looks up the prediction error in the context-specific coding table for the context of the pixel and encodes that value. To decompress an image, the decompressor determines and quantizes the context of each pixel being decoded.

In Weinberger context values are received from the pixel sequence generator (1209). The context values are fed into the context determination unit, and the context determination unit outputs a context index. The context index is input into the decoding table selector (709), which uses the index to fetch an appropriate Huffman table. See Weinberger column 17, lines 1-27. The Huffman tables are used by the encoder to encode the prediction residuals for each individual pixel in the image being compressed. The image decoder receives an encoded pixel and the context values, i.e. the neighboring pixels of the encoded pixels, and Huffman tables. The values of the context pixels are used to select the Huffman table which the encoder has selected when encoding the encoded pixel in question.

First, applicant respectfully submits that Weinberger fails to disclose or suggest searching for a prediction value corresponding to pixel, as recited in claim 1. In contrast to claim 1, Weinberger only discloses that the context of a pixel is determined by the pixels in a template that includes previously encoded pixels. See Weinberger column 4,

lines 55-57. However, in the present invention one pixel is used for the prediction value. Therefore, at least this limitation is not disclosed or suggested by the cited references.

In addition, Weinberger also fails to disclose or suggest encoding a code word to the encoded bit string to indicate the selected encoding method. In contrast to claim 1, Weinberger discloses that the decoder receives the context values and the context determination unit of the decoder generates an index on the basis of which the decoding table selector selects the decoding table. However, there is no teaching or suggestion that a code word is encoded to indicate the selected coding method, as recited in claim 1. The context values, i.e. pixel values, are not the equivalent as receiving a code word, and using the code word as an indication of the selected encoding method or of the decoding method to be selected. Therefore, Weinberger fails to disclose or suggest encoding a code word to indicate the selected encoding method, since the context values are not the equivalent of the code word recited in claim 1.

Furthermore, Weinberger also fails to disclose or suggest encoding the pixel into the encoded bit string so that the encoded bit string has a restricted number of bits that is fixed for substantially all of the encoded pixels in the image, as recited in claim 1. Instead, Weinberger only discloses that in Huffman coding at least one bit is needed for encoding each pixel, and does not disclose that Huffman coding forms one-bit per pixel code words. See Weinberger column 4, lines 49-50. Instead, Weinberger does not disclose that the code of 1 bit would be used or that the minimum or maximum length of the code is 1 bit, but rather that the Huffman code is quite inefficient if the statistics are not suitable. Weinberger only discloses that the Huffman codes require a minimum code length of one bit per encoding. In Weinberger, Huffman code is used for describing which coding table and which predictor is used, i.e. which predictor is selected on the basis of terms and context. However, in the present application there is no need for any tables, because the present application defines the value direction when a codec is known. In Weinberger, a separate Huffman table needs to be designed for each context.

In addition, Weinberger only discloses that the context model is fixed, but does not disclose or suggest that the context model has a fixed length. See Weinberger

column 6, lines 15-16. "Context model" means that the predictor is fixed and that a fixed coding table is used. The fixed context model does not therefore mean that the amount of cells and the lengths of the code words were fixed. In contrast, in the present application as recited in claim 1, the fixed length means that the complete codeword for one pixel is always of fixed length, and it includes the selection for codec, a possible sign and the word to be coded. The word to be coded is either quantized pixel value, or quantized difference of the pixel value and the prediction value. The efficiency of the method discussed in Weinberger is based on the fact that the predictor and the coding table is changed on the basis of the values of the previous pixels, and the statistics of the whole image, whereas in the present application the predictor and coding methods are always fixed.

Furthermore, on page 4 of the Office Action, the Office acknowledges that Weinberger does not disclose that after the prediction value has been found, determining the difference between the pixel and the prediction value, to select the method for encoding the bit string of the pixel, as recited in claim 1. Instead, the Office relies upon Kato for this teaching. However, Kato also fails to disclose or suggest this limitation of claim 1, because Kato only discloses that the difference between the estimate and the input data equals an estimation error. The estimation error is classified and a category index is generated. See Kato column 3, lines 15-17. The category corresponds to the estimation error. The input data is divided and a remainder of a result of the dividing is generated. The divisor is equal to a given value which is greater than a difference between an upper and a lower limit value defining a range of the category. The category index and the remainders are encoded into corresponding codes and the codes are output. The difference is not directly encoded to the codes, but via a category index and together with the remainder. See Kato Table 1.

The categories of Kato always represent powers of two, and therefore in Kato limits cannot be freely selected. However, in claim 1 the limits can be any of amount, and positive and negative categories are combined. In Kato, the remainder of the input data is always sent, while in the present invention the remainder after quantizing is rejected completely and the compression image is made possible so that each pixel as compressed is a code ware of desired length. Therefore, the categorization of Kato is

carried out by appointing a range to an estimation error, whereas in the present invention there are clear limits to different codes according to the error.

Therefore, for at least the reasons discussed above, the cited references fail to disclose or suggest all of the limitations recited in claim 1.

Independent claims 12, 23, 30-32 and 38 contain limitations similar to those recited in claim 1, and therefore for at least the reasons discussed above in relation to claim 1, are not disclosed or suggested by the cited references.

The claims depending from the above mentioned independent claims are not disclosed or suggested by the cited references at least in view of their dependencies.

In section 8, on page 12 of the Office Action, claims 6-7, 14, 17-18 and 34-35 are rejected under 35 U.S.C. § 103(a) as unpatentable over Weinberger in view of Kato, and in further view of Jones et al. (U.S. Patent No. 4,847,866). The claims rejected above all ultimately depend from an independent claim, and since Jones fails to make up for the deficiencies in the teachings of Weinberger and Kato with respect to the independent claims, the claims are patentable over the cited references at least in view of their dependencies.

In addition, with respect to claim 6, Jones does not use PCM codecs at all. Instead, Jones only discloses DPCM codecs whose predictor's or result value's limit values can be limited. Therefore, for at least this additional reason, claim 6 is not disclosed or suggested by the cited references.

In section 9, on page 18 of the Office Action, claims 5 and 15-16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Weinberger in view of Kato, and in further view of Jones and Anderson et al. (U.S. Patent No. 5,790,705). The claims rejected above all ultimately depend from an independent claim, and since Anderson fails to make up for the deficiencies in the teachings of Weinberger and Kato with respect to the independent claims, the claims are patentable over the cited references at least in view of their dependencies.

Conclusion

For at least the foregoing reasons, the present application is believed to be in condition for allowance, and such action is earnestly solicited. The undersigned hereby authorizes the Commissioner to charge Deposit Account No. 23-0442 for any fee deficiency required to submit this response.

Respectfully submitted,

Date: 29 July 2008

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